for the eggs of *C. albus*, a tentative identification with which C. R. S. Pitman, who has had more experience of the eggs of these species, also concurs. Archer records the presence of *C. albus* in this region but regards it as an infrequent visitor. Assuming the identification is correct, this may be the first evidence of breeding in this area.

The eggs of *C. c. edithae* in the collection are rather variable in shape, but small. They are usually marked, although often very sparsely, with fine spots or thin streaks and lines. The measurements for fifteen eggs are—average 41.1 × 29.2 mm; maxima *43.7* × 29.8, 39.1 × *31.8*; minima *39.1* × 31.8, 43.5 × *27.8* mm. It will be noted than an increase on one dimension tends to be matched by a decrease on the other.

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The Starred Bush Robin *Pogonocichla stellata* in eastern Rhodesia and adjacent Mocambique

by Michael P. Stuart Irwin

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Taxonomy

Pogonocichla stellata chirindensis (Roberts), 1914, *Ann. Transvaal Mus.*, 10: 176, with type locality Mount Selinda, has in recent years always been regarded as a synonym of *P. s. transvaalensis* (Roberts), 1912, *Journ. S. Afr. Orn. Un.*, 8: 21, described from Woodbush Forest Reserve in the north-eastern Transvaal. This is derived from the thorough revision and analysis provided by Moreau (1951: 383–400), and by Clancey (1969: 253–256), who has most recently reviewed racial variation in this species in south-eastern Africa. Clancey concluded that *chirindensis* was a synonym of *transvaalensis*, even though the Mount Selinda population was separated from that in the Transvaal highlands by over some 250 miles of ecologically unsuitable country. At this same time, however, Clancey described *P. s. hygrica*, with type locality Gorongosa Mountain in Moçambique, but also ranging southwards in the highlands of eastern Rhodesia (and by inference Moçambique), from Inyanga to the Chimanimani Mountains and Melsetter, and thus to within forty miles of the Mount Selinda population, with which there is at first sight no apparent geographical or ecological barrier.

However, it would seem that no adequate series of *chirindensis* topotypes has been collected in recent years; the majority of specimens available, and scattered among a number of museums, being those obtained by Swynnerton in the first decade of the present century. In late September and the first few days of October 1970 the writer and R. P. Borrett collected eleven specimens in the Chirinda Forest at Mount Selinda, the majority of which were then in breeding condition. Previously the only material in the National Museum of Rhodesia had been two old Swynnerton skins obtained in June 1906, another September skin collected in 1960, and one in an immature olive plumage (see Moreau, 1951: 390). When our freshly collected material was compared with twenty-nine specimens of *hygrica* from eastern Rhodesia, from the Chimanimani Mountains, and Melsetter northwards, and eight from Gorongosa Mountain, the differences separating the two populations became obvious, *hygrica* being darker, more

saturated in colour on the mantle, but the Mount Selinda birds altogether brighter, more yellowish green above. Neither series agreed with the description of *transvaalensis* as given by Clancey, nor did the Mount Selinda birds agree with two *transvaalensis* in the National Museum from Haenertsburg in the north-eastern Transvaal. Thanks to Mr. P. A. Clancey, Director of the Durban Museum, I have been able to examine a further four specimens of this form from the Ngome Forest, Louwsberg District, and the Woodbush and Mac Mac Forest Reserves, in the north-eastern Transvaal, as well as specimens of nominate *stellata* and *P. s. margaritata* of still further south, and another old Swynnerton specimen of *chirindensis*.

When *hygrica*, the Mount Selinda birds and *transvaalensis* are compared, the distinctiveness of the Selinda birds is apparent, as is that of *hygrica*. *P. s. hygrica* on the back is rather similar to *transvaalensis* and relatively saturated in tone. Below, however, the South African forms, excepting the nominate, are more orange-yellow on the chest and abdomen compared with the clearer lemon-yellow of *hygrica* and *chirindensis*. In this respect the latter two are similar to *P. s. orientalis* from north of the Zambezi, but which also differs more saliently in other characters. Although long relegated to the synonymy, *P. s. chirindensis* must now be recognised as a relatively distinctive race, separable from the adjacent *hygrica* on the colour of the back and from *transvaalensis* on both the colour of the back and underparts.

Post mortem cabinet colour changes are however evident, and this factor appears to have precluded the recognition of *chirindensis* in the past. Thus three Mount Selinda specimens collected in 1906 are saturated above and lack the yellowish green tones, and are more orange-yellow below, for all intents and purposes indistinguishable from relatively fresh specimens of *transvaalensis*. The clearer yellow and more greenish tones have apparently been lost. Clancey further states that a number of specimens from Rhodesia and even Gorongosa Mountain, collected alongside *hygrica*, represent *transvaalensis*. Eleven specimens in the National Museum are so marked by him. But significantly these are all old, or relatively old, ones, having been collected in 1906 (two), 1935, 1948, 1950 (two), 1951 (two), 1952, 1958 and 1960, whereas most of the remainder are much more recent in origin, no less than twenty-eight having been obtained by the writer within the last six years. Furthermore, seven out of eleven birds attributed to *P. s. transvaalensis* were collected in montane forest in the breeding season between September and January, when that form would be on its own breeding grounds. I prefer to attribute all eleven to *P. s. hygrica*, from which they do not appear to differ in any really significant way, although they may have undergone some slight *post mortem* change. The same applies to the three 1906 specimens, but which show a more marked change.

The populations and their movements

P. s. hygrica: That this species undergoes seasonal movements is now well established. Oatley (1966: 415–416) has demonstrated that this is a widespread phenomenon from Natal northwards to north-eastern Tanzania, while Benson & Irwin (1967: 73–74) provide further evidence for Zambia and Malawi. Still further information can now be given for *hygrica*. At 6,000 feet in the forests on Mount Inyangani at 18° 17′ S., 32° 55′ E. in the period October–November 1966, at the commencement of the breeding season, I found it especially abundant. In the same forest in March 1970, there was no sign of it except for a solitary bird mist-netted on the 16th of that month. This individual, an adult, was in an exceptionally heavy state of moult and in the process of replacing all the primaries and secondaries simultaneously, with

wing only 66 and tail 45 mm. It is doubtful if it could have moved at all in this condition and may at one stage have been flightless. In the foothills of these same highlands at 18° 23′ S., no less than eight specimens have been taken between the 18th July and 30th August at between 2,200 and 3,300 feet, and the latest high altitude record for the Inyanga area is in late January. Similarly, above 5,000 feet in the forest patches of the Stapleford Forest Reserve at 18° 41′ S., 32° 51′ E., there was no sign of it in June 1967, as would be expected, but in the Banti Forest Reserve at 19° 20′ S., 32° 47′ E., at a similar altitude, they were abundant in the first two weeks of September in the same year. That these highlands are not entirely vacated is shown by a specimen from Melsetter, 19° 45′ S., 32° 52′ E., at 5,900 feet as early as 13th August, and another from the Vumba, 19° 07′ S., 32° 46′ E., at c. 5,000 feet on 30th April. This kind of situation may be expected, as such movements in many instances may only involve travelling a few miles.

P. s. chirindensis: There is perhaps far less need for any seasonal movement in this population than in *hygrica*. As presently known *chirindensis* must breed between 3,000 and 4,100 feet in the Chirinda Forest at Mount Selinda at 20° 25′ S., 32° 43′ E., and undoubtedly also in the other smaller forest patches at around the same altitude between there and Chipinga at 20° 12′ S., 32° 38′ E., where I observed one on 26th March 1953. It is likely too that *hygrica* breeds no lower than about 4,000 feet, so that the differences in the forest environment occupied by these two forms is very considerable. Wild & Fernandes (1967: 4, 10–11) classify the Mount Selinda forest as "*moist evergreen: at low and medium altitudes*" (type 1), whereas *hygrica* occupies "*moist broad leaved forest (montane): at high altitudes*" (type 7). The differences between these two types of forest are considerable, largely due to that in altitude, which especially affects the temperature, Mount Selinda being much more tropical in character.

That *chirindensis* may be quite sedentary is indicated by Swynnerton (1907: 66–67), who records that he examined the stomachs of no less than seventeen birds trapped between May and the beginning of July, and gives no indication of a seasonal exodus (these specimens are all in the British Museum, and are all labelled as from Chirinda at 3,900 or 4,000 feet). Furthermore the record by Swynnerton (1908: 86) of a female with very strongly developed ovaries on 10th August (when *hygrica* would be on its wintering grounds), indicates perhaps an earlier breeding season, and the presence there of a young bird in spotted dress in July that may have come from a late brood. (This would be the bird referred to by Moreau, 1951: 389, as *transvaalensis* in spangled dress. It cannot at present be found in the British Museum, where it should be. But there is no reason to doubt the record). Yet in August Swynnerton recorded the species as very common in dense bush in the lower Jihu at c. 2000 feet in neighbouring Moçambique. (These specimens are in the British Museum and are labelled Kurumadzi River, Jihu, 10th August 1906). The Kurumadzi is a tributary of the Xinica River in Moçambique, although it has its source in the Chirinda Forest, and may be placed at approximately 20° 31′ S., 32° 46′ E. As it is now over sixty years since these specimens were collected it is not possible to identify them subspecifically, but such birds are more likely to be wintering *hygrica*. On the other hand there is a single specimen in the National Museum obtained on the Makurupini River near the Lusitu-Haroni confluence at 20° 02′ S., 33° 02′ E. at an altitude of only 1,400 feet, on 26th August 1969. It is quite clearly referable to *chirindensis* and may have been derived from forest patches lying south of the Lusitu River in Moçambique where this form

is very likely to occur, and it seems unlikely that it came from anywhere near Mount Selinda. It is also just possible that wintering *hygrica* may on occasion occupy the same range as *chirindensis*.

Although existing in such close geographical proximity it would seem that these two races must be isolated reproductively, and that there can be little if any gene-flow between them. Great differences must also exist in the size of each population. While it is difficult to estimate with any degree of accuracy the extent of the habitat available to each race in Rhodesia and Moçambique, *hygrica* may possibly occupy as much as 250 square miles of montane forest. *P. s. chirindensis* is much more restricted in this respect in both overall range and the area of habitat available. The Chirinda Forest at Mount Selinda comprises only some 3,700 acres, and even considering forest patches elsewhere in the Chipinga District and neighbouring high ground in Moçambique, it is most unlikely that such mid-altitude forests would exceed a dozen or so square miles in area. Assuming roughly similar population densities in the two types of forest, the total number of individuals of *chirindensis* may be as little as one-twentieth of that of *hygrica*. The small size of the former may have hastened its differentiation from *hygrica*.

The population of Mount Selinda and the surrounding country may have become more or less effectively isolated since the end of the Pleistocene or about 15,000 years ago (Moreau, 1966: 59–60). Prior to this the forest in the Chipinga District must have been more like that now occupied by *hygrica*, and consequently any population then living there would have been subject to seasonal movements. *P. s. chirindensis* could therefore have started to evolve with the onset of the warmer conditions of the present period, when the necessity for seasonal movement would have been gradually reduced, and finally ceased, thus leaving *chirindensis* effectively isolated from the population of *hygrica* in the highlands to the north of the Lusitu River in the Melsetter District and the Chimanimani Mountains, northwards in eastern Rhodesia and adjoining Moçambique.

Finally, in parenthesis, it is worth drawing attention to an aberrant specimen in the British Museum trapped by Swynnerton in the Chirinda Forest at 4,000 feet on 28th May 1905, and mentioned by him (1908: 87). As it now appears, all the normal yellow coloration has been replaced by creamy white, and the green of the upperside by a slightly greenish grey.

Summary

Using freshly collected material, *Pogonocichla stellata chirindensis* of Mount Selinda, south-eastern Rhodesia, is found to be a valid form. It differs from *hygrica*, of further north in eastern Rhodesia and Moçambique, and *transvaalensis* of the north-eastern Transvaal, in being a brighter, less dark, green above. *P. s. transvaalensis* is orange-yellow below, rather than lemon-yellow as in *chirindensis* and *hygrica*. *P. s. hygrica* has off-season movements to lower levels, whereas *chirindensis* appears to be sedentary. But *hygrica* breeds in montane forest, probably never below 4,000 feet, whereas *chirindensis* seems confined to moist evergreen forest at 3,000–4,000 feet. The population of *chirindensis* is thought to be only about one-twentieth of that of *hygrica*. The latter may have been evolved in the last 15,000 years, with the onset of warmer conditions.

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Variations in plumage of male and female White-crowned Manakins *(Pipra pipra)*

by F. Haverschmidt

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It is now known that adult females of the Golden-headed Manakin (*Pipra erythrocephala*) (Snow, 1962) and the Crimson-hooded Manakin (*Pipra aureola*) (Haverschmidt, 1965) sometimes have feathers characteristic of the male plumage.

This also applies for the White-crowned Manakin (*Pipra pipra*). The male of this species is glossy black all over except on the crown and the nape which are glossy white, while the female has dark olive green upperparts, except the upper head which is slate grey, while the underparts are dark greyish with a green tinge. The juvenile male is like the female.

When in the forest near Phedra (Surinam) on 6th April 1961 a small bird suddenly flew from the undergrowth. My first impression was that I had flushed it from its nest, but a prolonged search failed to locate it. I collected the bird that proved to be a *Pipra pipra* in the green plumage of the female, but with a number of black feathers in the coverts of the right wing and a black secondary in the right wing. At first glance I took it for a male in intermediate plumage and—as the male does not take part in the nest life—my presumption that I had flushed it from its nest seemed unjustified. When afterwards making a specimen of it I established to my surprise that it was a female with a well developed ovary.

As I reported previously (Haverschmidt, 1958) the male of *Pipra pipra* may be sexually mature before it has attained the full male plumage. Apart from the specimen mentioned in my earlier note I collected on 9th October 1960 at Zanderij (Surinam) a specimen in the green plumage of the female without any trace of the male's dress and another one near Phedra on 28th March 1965 in the female's plumage but with a few white feathers on the crown and a few black feathers on the chin and throat. Both birds had greatly enlarged testes.

Thus in *Pipra pipra* males in juvenile and intermediate plumage cannot be separated from adult females on the basis of plumage.

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